

R E M A R K S

Claim 10 was amended to include some of the features of claims 17 and to include the features of claim 19.

Claims 14, 15 and 16 were editorially revised.

New claim 32 is supported in the specification on page 20, line 5.

The presently claimed invention concerns an apparatus for cooling a hot rolled steel strip and a method for cooling a hot rolled steel sheet using such apparatus. The apparatus comprises a runout table to transfer a hot rolled steel strip on rotating transfer rolls, a cooling means to cool the hot rolled steel strip and a water breaking means disposed above the transfer rolls. In the presently claimed invention, the cooling means comprises at least one upper surface cooling means and at least one lower surface cooling means. The upper surface cooling means and the lower surface cooling means are arranged so that they face each other through the hot rolled steel strip. The upper surface cooling means comprise nozzles for ejecting cooling water to form an upper laminar flow. The lower surface cooling means comprise nozzles for ejecting cooling water to form a lower

laminar flow. The upper surface cooling means and the lower surface cooling means eject cooling water such that the upper laminar flow and the lower laminar flow are symmetric with respect to the steel strip. Stated differently, cooling water is ejected symmetrically with respect to the steel strip in upper and lower directions (see page 6, line 24 through page 7, line 1 of the present specification). Accordingly, the upper and lower surfaces of the steel sheet can be symmetrically and rapidly cooled. Therefore, a hot rolled steel strip with a fine grain size can be stably produced (see page 7, lines 14 to 17 of the specification).

Claims 10 and 19 were rejected under 35 USC 102 as being anticipated by JP 9-201614 for the reasons set forth in the paragraph bridging pages 2 and 3 of the Office Action.

JP 9-201614 shows the injection direction of the cooling water nozzle 13 and the water stream F in Fig. 4 and Fig. 5 therein. However, JP 9-201614 does not teach or suggest the relationship of the upper laminar flow and the lower laminar flow of the cooling water as recited in applicants' claims.

Claims 10, 11, 15, 16, 17 and 19 were rejected under 35 USC 103 as being unpatentable over Hollander et al.

USP 3,533,261 in view of JP 7-9018 for the reasons set forth in the last paragraph on page 3 of the Office Action.

It was admitted in the Office Action that Hollander et al. do not teach the additional use of a water breaking means located at least at the outlet of the cooling means.

Hollander et al. USP 3,533,261 in Fig. 3 show two cooling sections above on top of the steel strip 100 and two cooling sections underneath the steel strip 100. However, in contrast to the presently claimed invention, Hollander et al. do not teach or suggest that the upper laminar flow and the second laminar flow of the cooling water are symmetric with respect to the steel strip.

JP 7-9018 teaches only a water breaking device of a rolling mill.


It is therefore respectfully submitted that applicants' claimed invention is not anticipated and is not rendered obvious over the references, either singly or combined in the manner relied upon in the Office Action, in view of the distinctions discussed hereinabove. It is furthermore submitted that there are no teachings in the references to combine them in the manner relied upon in the Office Action.

Reconsideration is requested. Allowance is solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

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Respectfully submitted,



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Enc.: PETITION FOR EXTENSION OF TIME.